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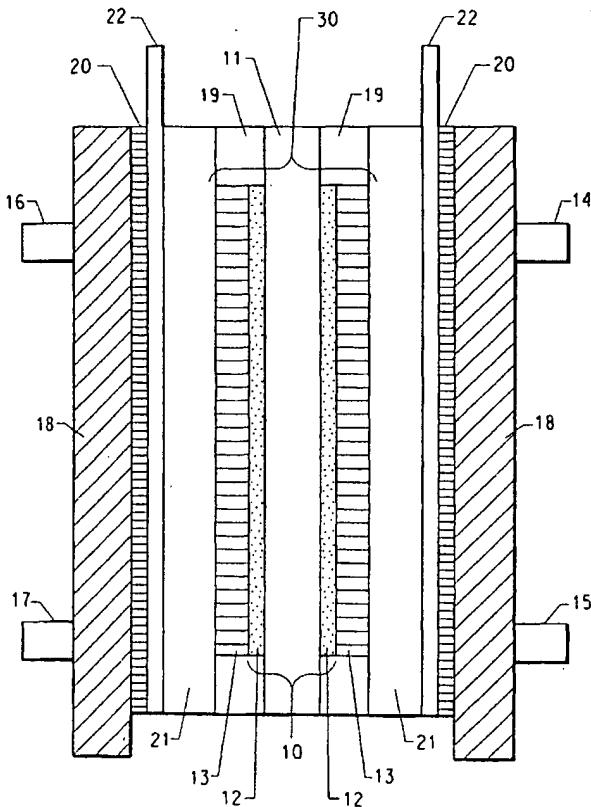
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**(54) Title: SULFONIMIDE CONTAINING COMPOUNDS AND THEIR USE IN POLYMER ELECTROLYTE MEMBRANES FOR ELECTROCHEMICAL CELLS**



**(57) Abstract:** A compound having the general structure (I), wherein  $A_1$ ? is a monovalent, divalent, or trivalent aromatic heterocyclic group comprising heterocyclic rings;  $R_1$ ?  $R_2$ ?, and  $R_3$ ? are divalent fluorinated groups;  $m$ ,  $n$ , and  $p$  are 0 to 3, with the proviso that  $m + n + p$  is equal to 1, 2, or 3 so that the carbon atoms of the heterocyclic rings are fully substituted by acidic fluorinated sulfonyl-containing groups;  $q$  is 0 or 1;  $Y_1$ ? is  $-\text{OH}$ ,  $-\text{NH-SO}_2\#191-\text{R}_4$ ? wherein  $R_4$ ? is a monovalent fluorinated group,  $-\text{NH}-$ ,  $-\text{NH-SO}_2\#191-\text{R}_5$ ?  $\text{SO}_2\#191-\text{NH}-$ , or  $-\text{NH-SO}_2\#191-\text{R}_6$ ?  $A_2$ ?  $R_7$ ?  $\text{SO}_2\#191-\text{NH}-$ , wherein  $A_2$ ? is a divalent heterocyclic group and  $R_5$ ?,  $R_6$ ?, and  $R_7$ ? are divalent fluorinated groups; and  $Y_2$ ? and  $Y_3$ ? are  $-\text{OH}$  or  $-\text{NH-SO}_2\#191-\text{R}_4$ ?; with the proviso that when  $m$  and  $n$  are each equal to 1,  $p$  is 0 to 1, and  $q$  is 0,  $Y_1$ ? is selected from the group consisting of  $-\text{NH}-$ ,  $-\text{NH-SO}_2\#191-\text{R}_5$ ?  $\text{SO}_2\#191-\text{NH}-$ , and  $-\text{NH-SO}_2\#191-\text{R}_6$ ?  $A_2$ ?  $R_7$ ?  $\text{SO}_2\#191-\text{NH}-$ . By compound is meant either a small molecule or a repeat unit of a polymer. The invention also provides a solid polymer electrolyte membrane, a membrane electrode assembly, a gas diffusion electrode, an electrocatalyst coating composition, and a fuel cell.



FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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